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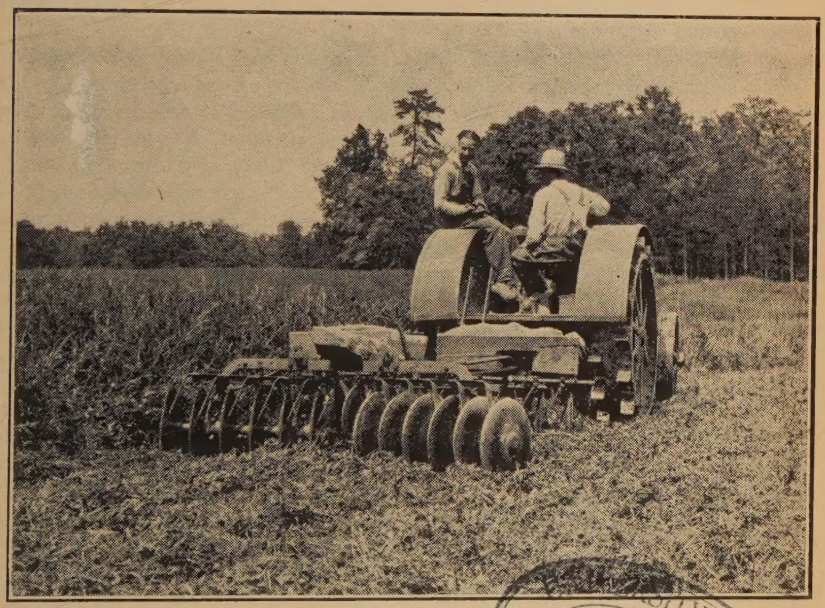

Discing Down a Cover Crop to Turn Under

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WINTER LEGUMES FOR SOIL IMPROVEMENT

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Actual demonstrations conducted in North Carolina during the past few years have shown that a good crop of either crimson clover or vetch, when turned under, may be relied upon to add 15 to 30 bushels per acre to the yield of corn. This increase may be had at a cost of about $4.00 per acre for seed and labor. Cotton and peanuts have also responded well to the turning under of these winter legumes. While no definite results have been secured with the Austrian winter pea, observations indicate that this newly introduced crop is as valuable for soil improvement as the better known ones.

The demonstrations (see tables 1 and 2) show that the turning under of legumes is just as beneficial on good land as on poor land, as will be noted by comparing the yields of plat 3 where legumes were turned under with those of plat 1, on which no legume was grown. A study of the yields of plat 2, where the legumes were cut for hay, leaving considerable stubble, shows an increase in yield, but less than where legumes were turned under. In Edgecombe County (Table 1) two successive crops of crimson clover were grown on the same land. In this case the yield of corn showed a decrease after the removal of the second crop, while the turning under of the second crop further increased the yield. It sometimes happens that a legume crop plowed in too late will be of no benefit that year, especially if the summer be dry. This happened in Hertford County in 1926 (Table 2). But the unusually large yield of corn secured when this demonstration was repeated in 1927 shows that the 1926 vetch crop finally became effective.

That the effect of legumes lasts more than one year is shown in Table 3. In each case the cotton followed a corn crop, the vetch having been turned under before planting the corn.

Although the need of corn for nitrogen and organic matter is well known, it is not generally recognized that peanuts need them also. However, Table 4 shows very definite increases to the peanut crop by turning under vetch and crimson clover.

While it is inexpensive to sow winter legumes, one should remember that to get a good stand they must be sown at the right time and in the right way, that early sowing means early maturity, that the presence of the proper nitrogen-gathering bacteria in the soil is necessary for a good growth, and that the crop must decay rapidly after being turned under if it is to do much good that year. To facilitate the latter, the crop should be cut up with a disc harrow before turning, and should be turned by the time it is in full bloom.

CRIMSON CLOVER

The strains of red blooming crimson clover grown in the southeastern states and in central Europe are usually ready for turning under about May 1, while those from our northwestern states and from northern Europe are two to four weeks later. The white blooming variety is also late.

Crimson clover does not reseed itself well under North Carolina conditions, as the seed come up too early and are killed by heat and drought. However, much seed may be saved by cutting and threshing the ripened crop or by means of a "stripper." The seed may be sown in the hull, or after being cleaned. The former are more likely to give a good stand, but are slower to germinate than the cleaned seed. The proper rate of seeding is 30 pounds per acre in the hull, or 25 to 30 pounds of clean seed.

The seeds are so small that they will not germinate if covered over an inch deep, and since moisture is required for germination it follows that the soil must be moist to the very top. There must also be good prospects that this moisture will remain until the roots have time to penetrate two or three inches. For this reason it is hardly worth while to sow crimson clover on soils that are likely to be very dry in the fall, such as coarse sandy soils or clay soils low in organic matter.

Many stands of crimson clover are lost every year by sowing before the heat of summer has moderated. Excessive shading, too, will kill the young plants if sown too early in fields of corn, cotton or soybeans. On the other hand, they must have time to develop a good root system before winter or

FIG. 1. Building up the soil with Crimson Clover by farmers of Stanly County.

they will probably be frozen out. As a rule, the best time to sow crimson clover in mountain valleys is from August 15th to September 15th, in the Piedmont from September 1st to September 30th, and in the Coastal Plain from September 15th to October 15th. Seed in the hull should be sown a month earlier than the above dates.

Very little seed bed preparation is necessary for crimson clover. A good method of sowing is to scatter the seed in growing corn or cotton, and cover with a very fine toothed cultivator. At this point it may be well to mention the fact that late varieties of soybeans, such as the Biloxi and

Otootan, planted with corn will so shade the land as to ruin the clover.

After removing a tobacco crop the land may be put into condition for crimson clover by cutting the stalks and levelling the ridges with a disc harrow. Then sow the seed and cover with a weeder or a brush drag. A still better way is to mix the seed with inoculation soil, or fertilizer, and sow them very shallow through a grain drill.

Fields that have lain out during the summer may be disced, and then sown as just described for old tobacco fields.

In the mountain and Piedmont sections the widespread use of red clover has already inoculated practically all land for crimson clover.

But in the coastal plain the nitrogen-gathering bacteria must be supplied artificially when starting with this crop on a new field. The best method is to mix the seed for one acre with 200 to 300 pounds of soil from a field known to be well inoculated, and sow with a grain drill. Where no grain drill is available the sowing may be done by hand. Another method is to moisten the seed with water and molasses (about a cupful of each to a bushel of seed) and mix with inoculated soil. The molasses causes some of the soil to stick to every seed, which are then sown in the usual way. A good commercial culture may be used, following directions on the container. Any two, or all three methods may be combined. Never expose inoculated seed to direct sunlight. Always cover immediately after sowing. A light application of stable manure is helpful in getting a good catch of inoculation. If only partial success is secured the first year, another crop of crimson clover on the same land is almost sure to result in thorough inoculation. After a field is once well inoculated, it may be kept so by simply growing crimson clover on it once every three to five years. Some farmers begin by inoculating one acre, after which the soil is used freely in spreading the inoculation to the rest of the farm.

VETCH

There are several kinds of vetch, among which are Hairy (or winter), Carolina, Common (or narrow leaf), Hungarian, Oregon (or spring), Monantha, and Purple. Of all these the Hairy and the Carolina are far the best for North Carolina conditions. There is very little difference in Southern, Northern or European grown strains of Hairy vetch. Vetch is usually ready for turning under (in full blooming stage) about ten days after crimson clover. If allowed to stand two or three weeks longer and ripen seed, it will reseed itself. Seed may easily be saved in North Carolina by growing the crop with small grain, cutting and threshing the two together, and then separating out the vetch seed.

This crop will grow well on practically all North Carolina soils, from heavy clays to coarse sands. It may be sown from August 15th to December 1st, but September sowing usually gives best results. When used for hay vetch should be sown with oats, barley, or wheat. For soil improvement it is often sown with rye. This practice is objectionable in that the rye gets ready to turn under at least a month before the vetch, and has become hard and woody by the time the vetch is ready. In such cases the drying out effect of the rye on the soil often more than counteracts any benefit that might be derived from the vetch. A better practice is to sow vetch alone, except on fields where the prospects for successful inoculation are doubtful. On such fields wheat or barley should be used, as they

will come to maturity at about the same time as the vetch, or if rye be used it should be kept down during the spring by mowing or grazing.

The proper rate of seeding vetch is 25 pounds per acre, or 20 pounds on well inoculated land. Being rather large, hairy vetch seed should be covered two to three inches deep. There is nearly always enough moisture at this depth to bring them up at once.

FIG. 2. Hairy Vetch grown for soil improvement in Lee County.

Vetch may be sown in fields of corn or cotton, after tobacco, or on specially prepared ground, just as crimson clover is. The only difference is that heavier implements should be used to cover vetch, so as to get it in deeper. Another way to sow vetch is to scatter it in peanut fields just before digging the peanuts, letting the implement that digs the peanuts cover the seed. In fact, vetch would be as easy to grow as rye were it not for the matter of inoculation.

But unfortunately vetch has not been as widely grown in North Carolina as the various clovers, therefore it is unsafe to omit inoculation on any field not known to be already inoculated. The methods of inoculating vetch are the same as described for crimson clover. In the mountain and Piedmont sections the molasses and water method or a commercial culture may be used. But in the coastal plain, especially on the sandier soils, it is advisable to use 200 to 300 pounds of soil from a good field of vetch. If this be impossible, use one of the other methods, with a good application of stable manure. It is best to start on a small scale, thereby getting soil with which to inoculate larger fields. It sometimes takes two or three crops of vetch to establish the inoculation thoroughly.

The Austrian winter pea produces nodules much more abundantly than does vetch, and will inoculate the soil for vetch, it might pay to start with the peas, and sow no vetch until the inoculation is well established.

AUSTRIAN WINTER PEAS

The Austrian winter pea, which is a variety of the Canada field pea, was first grown in North Carolina about five years ago. It is rapidly increasing in popularity. This plant closely resembles the ordinary garden pea, except that the blooms are a rich purplish red. It is easy to grow, produces plenty of vegetation and is apparently easier to inoculate than vetch. Vetch has been known to overpower it where the two were sown together. Since the seed are larger than those of vetch, at least 30 pounds should be sown per acre.

FIG. 3. Although only five years old in North Carolina the Austrian Winter Pea is gaining in popularity as a soil improving crop.

The winter pea may be sown at any time from September 1st to December 1st, in the same way as vetch. This year a good growth has resulted from sowing on February 27th. This crop may be turned under earlier in the spring than either of the other winter legumes.

TABLE 1

RESULTS OF TURNING UNDER CRIMSON CLOVER FOR CORN

Location and soil type	Year	Yield per acre—Corn, bushels			Increase due to turning under Crimson clover —Bushels per acre
		Plant 1 No Crimson Clover	Plant 2 Crimson clover removed	Plant 3 Crimson clover turned under	
Jones County Portsmouth sandy loam	1922	26.1	37.7	41.5	15.4
Bertie County Dunbar sandy loam	1924	16.0	29.0	36.1	20.1
Martin County Norfolk sandy loam	1925	32.2	49.7	58.8	26.6
Martin County Portsmouth sandy loam	1925	48.6	65.8	74.4	25.8
Edgecombe County Norfolk sandy loam	1926	18.0	54.6	60.9	42.9
	1927*	33.3	50.2	72.2	38.9
Bertie County Norfolk sandy loam	1928	38.6	47.1	52.9	14.3
Jones County Norfolk sandy loam	1929	17.1	----------	35.6	18.5
Average	-------	28.7	47.7	54.0	25.3

*Demonstration repeated on same land used in 1926.

TABLE 2

RESULTS OF TURNING UNDER HAIRY VETCH FOR CORN

Location and Soil Type	Year	Yield per acre—Corn bushels			Increase due to turning under hairy vetch Bushels per acre
		Plat No. 1 no vetch	Plat No. 2 Hairy vetch removed	Plat No. 3 hairy vetch turned under	
Richmond County Norfolk sand	1923	22.9	----------	46.9	24.0
Moore County Norfolk sand	1927	48.7	----------	61.9	13.2
Hertford County Norfolk sandy loam	1927	41.4	----------	56.0	14.6
Hertford County Norfolk sandy loam	1926	38.9	34.2	35.3	3.6
	*1927	43.6	58.6	87.1	38.5
Lee County Norfolk sandy loam	1928	25.8	39.1	43.7	17.9
Carteret County Norfolk sandy loam	1929	22.0	30.7	33.1	11.1
Jones County Norfolk sandy loam	1929	17.1	----------	38.9	21.8
Average	----------	33.2	----------	50.4	17.2

*Demonstration repeated on same land used in 1926.

TABLE 3

RESULTS OF TURNING UNDER VETCH IN 1927 ON THE 1928 COTTON CROP

Location and Soil Type	Yield per acre—Seed Cotton—pounds			Increases due to turning under vetch —pounds per acre
	Plat 1 no Vetch	Plat 2 Vetch cut for hay	Plat 3 Vetch turned under	
Hertford County Norfolk sandy loam	676	----------	1113	437
Duplin County Norfolk sandy loam	800	916	1314	514
Average	738	----------	1214	476

TABLE 4

RESULTS OF TURNING UNDER WINTER LEGUMES FOR PEANUTS

Location and soil type	Year	Kind of legumes turned under	Yield per acre—peanuts bus.		Increase due to turning under legumes —bu. per acre
			Plat 1 No legume turned under	Plat 2 Legumes turned under	
Bertie County Norfolk sandy loam	1927	vetch	101.8	120.5	18.7
Bertie County Norfolk sandy loam	1927	Crimson clover	101.8	133.3	31.5
Bertie County Norfolk sandy loam	1929	Vetch and crimson clover	43.3	74.5	31.2